

## **Unemployment, Crime, Policing**

### **Question:**

What is, if there exists a relationship between crime, police violence and unemployment?

### **Links:**

[https://docs.google.com/spreadsheets/d/1dKmaV\\_JiWcG8XBoRgP8b4e9Eopkpgt7FL7nyspvzAsE/edit#gid=0](https://docs.google.com/spreadsheets/d/1dKmaV_JiWcG8XBoRgP8b4e9Eopkpgt7FL7nyspvzAsE/edit#gid=0)

<https://www.ucrdatatool.gov/Search/Crime/State/RunCrimeStatebyState.cfm>

<https://data.bls.gov/pdq/SurveyOutputServle>

<https://www.ucrdatatool.gov/Search/Crime/State/RunCrimeStatebyState.cfm>

### **Summary:**

Prior use of data has shown the decline of violent crime between the period of 1960 to the 2010s, and more sharply around 1980. In parallel, over the last decade police violence has seemed to be on the rise, with its more palpable expression that is Fatal encounter (The victim is not an officer). After obtaining and cleaning verified data from Bureau of labor, the department of Justice and a non profit organization, I have calculated the rate of change of Fatal encounters versus violent crime. Between 2000 and 2017, criminality in the case of violent crime has been lagging behind police violence and fatal encounters. Surprisingly, we notice that a rise or decline in the rate of change of fatal encounters is followed by a growth or reduction of the violent crime rate of change. Also, the peak in unemployment in 2009 (starting in 2006) is followed more surprisingly, by the rise of the police violence (starting in 2008) before a more gradual increase in the rate of change of violent crime (starting in 2010). Unemployment seems to be a trigger for violence, although, oddly, over the last decade, it seems to have triggered police violence first.

### **Method:**

- 1- I tried to represent a truthful visual when I compared my data. I decided to calculate the rate of changes to make my variables comparable since the police/population or police/offender ratio is not 1. Also I separated the unemployment rate of change from the main plot so that important feature would show. The unemployment rate of change is large and would have flattened the curves
- 2- I tried to produce a beautiful visual by my choice if color (for example turquoise) and the choice of the parameter  $\alpha = .07$  for the shaded area so that the result would be appealing and not visually “aggressive” with very bright colors.
- 3- I have made my plot functional by representing the rate of change of the variables so that the reader would identify easily peculiar points, occurring in 2009 for example. Shading areas gives an indication to the reader of periods during which there is a disproportion (both ways) between crime and police violence.

- 4- I have tried to be insightful by showing the rate of change of the variables instead of simply plotting the variables and pointing out a relationship between the variables that is counter-intuitive for the last decade.

### **Code (python 3.6):**

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from scipy.interpolate import spline

%matplotlib notebook

df = pd.read_csv('Fatal_Police.csv', encoding='Latin-1')
dfnew = df[['Date (Year)', 'Location of death (state)']]
dfnew["Number"] = 1
dfnew = dfnew[np.isfinite(dfnew['Date (Year)'])]
dfnew = dfnew.dropna()
dfnew['Date (Year)'].astype(dfnew.index)

dfnew1 = dfnew.groupby(['Date (Year)', 'Location of death (state)']).sum()
dfnew2 = dfnew.groupby(['Date (Year)']).sum()
dfnew3 = dfnew.groupby(['Location of death (state)']).sum()
```

```
dfnew3 = dfnew3.drop(['Date (Year)'], axis=1)
```

```
df2 = pd.read_csv('Violent_Crime_Report.csv', encoding='Latin-1', skiprows = 1,  
header = 1, thousands=',')
```

```
df2.drop(df2.index[0], inplace = True)
```

```
df2['Year'][56] = '2015'
```

```
df2['Violent crime tota'][56] = 1197704
```

```
df2['Year'][57] = '2016'
```

```
df2['Violent crime tota'][57] = 1248185
```

```
df2new = pd.concat([df2['Year'][40:],df2['Violent crime tota'][40:] ], axis = 1, keys =  
['Year', 'Violent crime tota'])
```

```
dfnew2 = dfnew2.drop(dfnew2.index[18])
```

```
# Rate of increase of fatal encounter with Police
```

```
dfnew2['Rate'] = 100*dfnew2['Number'].diff()/(dfnew2['Number']-  
dfnew2['Number'].diff())
```

```
# Rate of increase of Total number of Violent crime
```

```
df2new['Rate'] = 100*df2new['Violent crime tota'].diff()/(df2new['Violent crime  
tota']-df2new['Violent crime tota'].diff())
```

```
df3 = pd.read_csv('SeriesReport.csv', encoding='Latin-1', skiprows =11)
```

```
a = []
```

```
a = df3['Year']
```

```
df3.drop(['Year'], axis = 1, inplace = True)
```

```
df3['Avg'] = df3.mean(axis = 1)
```

```
df3.set_index([a], inplace = True)
```

```
df3['Rate'] = 100*df3['Avg'].diff()/(df3['Avg']-df3['Avg'].diff())
```

```
df3new = df3['Rate'][1:17]
```

```
T = [2000.0, 2001.0, 2002.0, 2003.0, 2004.0, 2005.0, 2006.0, 2007.0, 2008.0, 2009.0,  
2010.0, 2011.0, 2012.0, 2013.0, 2014.0, 2015.0, 2016.0]
```

```
#xnew = np.linspace(2000, 2016,320)
```

```
#Crime_smooth = spline(T,df2new['Rate'],xnew)
```

```
#plt.plot(xnew,Crime_smooth, '--', color = 'red')
```

```
y1 = dfnew2.drop(dfnew2.index[17])
```

```
y1 = y1.drop(y1.index[0])
```

```
y2 = df2new.drop(df2new.index[0])
```

```
y1.set_index([[2001.0, 2002.0, 2003.0, 2004.0, 2005.0, 2006.0, 2007.0, 2008.0,  
2009.0, 2010.0, 2011.0, 2012.0, 2013.0, 2014.0, 2015.0, 2016.0]], inplace = True)
```

```
y2.set_index([[2001.0, 2002.0, 2003.0, 2004.0, 2005.0, 2006.0, 2007.0, 2008.0,  
2009.0, 2010.0, 2011.0, 2012.0, 2013.0, 2014.0, 2015.0, 2016.0]], inplace = True)
```

```
#2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013,  
2014, 2015, 2016
```

```
plt.figure(figsize=(10, 10), facecolor='White').add_subplot(111, frameon=True)
```

```
#plt.tick_params(labelcolor='none', top='off', bottom='off', left='off', right='off')
```

```
#plt.grid(False)
```

```
#plt.xlabel("common X")
```

```
ax1 = plt.subplot(211)
```

```
plt.title('Police Violence leading Violent crimes over the last decade',  
fontweight='bold')
```

```
L1 = plt.plot(df2new['Year'], df2new['Rate'], color = 'r' , alpha = .5, label = 'Violent  
Crime')
```

```
L2 = plt.plot(dfnew2['Rate'] ,color = 'blue' ,alpha = .5, label = 'Police Fatal  
encounter')
```

```
plt.ylabel('% Rate of Change', fontweight='bold')
```

```
plt.setp(ax1.get_xticklabels(), visible=True)
```

```
ax1.xaxis.grid()
```

```
plt.legend()
```

```
plt.fill_between(y1.index, y1['Rate'], y2['Rate'], where=y1['Rate']>=y2['Rate'],  
facecolor='red', alpha = .07,
```

```
interpolate=True)
```

```
plt.fill_between(y1.index, y2['Rate'], y1['Rate'], where=y1['Rate']<=y2['Rate'],  
facecolor='turquoise',
```

```
interpolate=True)
```

```
ax2 = plt.subplot(313, sharex = ax1)
```

```
L3 = plt.plot(df3new, label = 'Unemployment')
```

```
plt.title('Rate of change of The Unemployment over the last  
decade',fontweight='bold' )
```

```
ax2.xaxis.grid()
```

```
plt.xlabel('Years', fontweight='bold')
```

```
plt.ylabel('% Rate of Change', fontweight='bold')
```

```
plt.legend(loc = 'upper left')
```

```
plt.subplots_adjust(left=None, bottom=None, right=None, top=None, wspace=None,  
hspace=0)
```

```
plt.savefig('Crime, Police violence and the Unemployment Rate.jpg', dpi = 300)
```

```
plt.show()
```